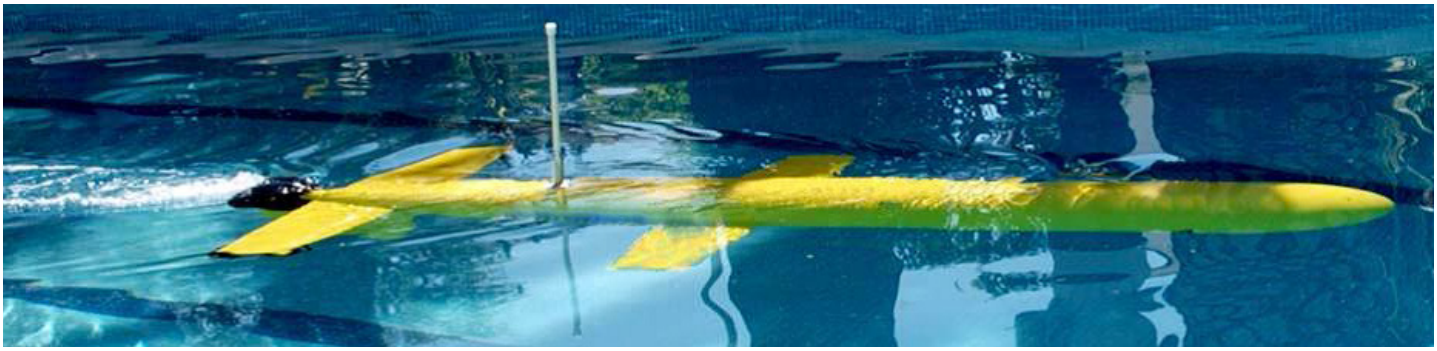
DESIGN AND CONSTRUCTION OF THE GUANAY-II AUTONOMOUS UNDERWATER VEHICLE

Ivan Masmitja

- State of art of AUVs
- Introduction
- Mechanical design of the vehicle
- Electronics development
- Mathematical model
- Experimental results

Figure 1 Experiments with Guanay II



INERTIAL, CLASSICAL AND ELECTRONIC COMPASS NAVIGATIONS, LORAN, (D) GPS, MAGNETIC SENSORS AND UNDERWATER MAGNETIC OBSERVATORIES AND COMMUNICATION BASICS - FROM MODULATIONS TO GNSS

Michal Janosek

A brief overview of various navigation techniques is given, covering dead-reckoning with compasses, gyroscopes and radio-direction finders, and finally LORAN and GPS are discussed. The limit of electronic compasses using orthogonal pair of magnetic sensors is shown to be around 0.5°. An approach to calculate the azimuth from orthogonal sensor pair and a typical calibration technique are shown. An accuracy of three commercial inertial systems is shown presenting the limits of inertial navigation in maritime use. In the second part, GPS and LORAN are compared. Although the LORAN navigation seemed to be phased-out being outperformed by GPS in the recent decade, its inherent immunity to jamming or changes in ionospheric propagation is an advantage. The electronic version, eLORAN is now used in a substantial part of Europe as a vital backup for GPS, and in south Korea it helps to overcome the GPS jamming issue. With recently announced high speed differential corrections, d-eLORAN accuracy is about 10m confirming its ability to backup GPS system. Basics of DGPS are presented and the IALA DGSP network for maritime users is discussed. At the end, also some non-standard navigation techniques applicable for ROV's and UAV's are presented, as the ultra-short-baseline navigation and position tracking using an artificial, low-frequency AC magnetic field.